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Handbook for Developing Watershed Plans to Restore and Protect Our Waters

Chapter 1. Introduction

October 2005

1. Introduction

Handbook Road Map	
1	Introduction
2	Overview of Watershed Planning Process
3	Build Partnerships
4	Define Scope of Watershed Planning Effort
5	Gather Existing Data and Create an Inventory
6	Identify Data Gaps and Collect Additional Data if Needed
7	Analyze Data to Characterize the Watershed and Pollutant Sources
8	Estimate Pollutant Loads
9	Set Goals and Identify Load Reductions
10	Identify Possible Management Strategies
11	Evaluate Options and Select Final Management Strategies
12	Design Implementation Program and Assemble Watershed Plan
13	Implement Watershed Plan and Measure Progress

Chapter Highlights

- ▶ Purpose of handbook
- ▶ Intended audience
- ▶ Chapter summaries
- ▶ Tips for using the handbook

Read this chapter if...

- You want to know if this handbook is intended for you
- You want an overview of all the chapters
- You want tips on how to skip around to various sections in the handbook

1.1 What Is the Purpose of This Handbook?

This handbook provides information on developing and implementing watershed plans that help to restore and protect water quality. Experience over the past decade has shown that effective watershed management includes active participation from stakeholders, analysis and quantification of the specific causes and sources of water quality problems, identification of measurable water quality goals, and specific actions needed to solve those problems.

A **watershed** is the land area that drains to a common waterway, such as a stream, lake, estuary, wetland, or ultimately the ocean.

Don't be daunted by the size of this handbook. Although it is comprehensive in terms of providing resources and tools for each step of the watershed planning process, it is laid out in an easy-to-read format with shortcuts and road maps along the way so you can flip to specific sections for more in-depth information. You might not need to read all the sections if you have already completed some stages of the watershed planning process. Read the highlights at the beginning of each chapter to determine whether you can skip to the next section.

Watershed plans are a means to resolve and prevent water quality problems that result from both point source and nonpoint source problems. Although the primary focus of this handbook is on waters listed as impaired under section 303(d) of the Clean Water Act, watershed plans are intended to provide both an analytic framework to restore water quality in impaired waters *and* to protect water quality in other waters adversely affected or threatened by point source and nonpoint source pollution.

This handbook is intended to serve as the basis for developing and implementing watershed plans to meet water quality standards and protect water resources. Although watershed plans are useful for all watersheds to protect and restore water resources, as well as to meet other community resource goals, they are critical for impaired or threatened waterbodies. The most recent national water quality assessment (2000) reported that 40 to 50 percent of the nation's assessed waterbodies are impaired or threatened. This handbook is designed to provide a framework to help you develop a scientifically defensible plan that will lead to measurable results and an overall improvement in the water quality and watershed conditions that are important to your community.

Developing watershed plans does not have to be an exhaustive, expensive endeavor. This handbook shows you how to effectively and efficiently collect the information you need to answer the right questions. The level of effort you expend preparing a watershed plan will depend on several factors, such as the available information, the size of the watershed, and the pollutants of concern.

Federal, state, and local organizations have developed many watershed guides. EPA intends for this handbook to *supplement*, rather than *replace*, those guides. Appendix A includes a list of some of the watershed planning guides for your reference.



1.1.1 How Is This Handbook Different from Other Guides?

This handbook is more rigorous and goes into greater detail than most watershed planning guides. It provides tools to *quantify* existing pollutant loads, *develop estimates* of the load reductions designed to meet water quality standards, and *identify reductions* associated with the management measures expected to achieve load reductions to meet water quality standards. Using these tools enables you to then develop effective management measures to reduce the loads. The handbook also provides tools to *track progress* once the plan is implemented to ensure that the management measures are helping to improve water quality.

1.1.2 Who Should Use This Handbook?

We have designed this handbook to be used by agencies and organizations that develop watershed plans. It is specifically intended for those working in a watershed where there are impaired or threatened waters. To use this handbook effectively, you should have a basic level of understanding about watersheds, their processes, and the major components to be included in a watershed plan. You might have to enlist the support of experienced professionals such as engineers, hydrologists, statisticians, biologists, and database managers to provide specific information for your watershed plan.

The primary audiences that will benefit from this handbook are the following:

Watershed organizations that are developing new plans, updating existing plans to meet funding requirements, or considering other watershed issues.

Local agencies that are developing or updating a watershed plan or need references to research a particular subject related to watershed planning.

State and tribal environmental agencies that are developing and reviewing watershed plans, participating as stakeholders on watershed planning committees, or providing guidance to watershed associations.

Federal environmental agencies that have similar planning programs to help identify overlapping activities, provide sources of data, and offer other kinds of financial and technical assistance.

A waterbody is **impaired** if it does not attain state water quality standards. **Threatened** waters are those that meet standards but exhibit a declining trend in water quality such that they will likely exceed standards.

1.1.3 What if We Already Have a Watershed Plan?

EPA recognizes that many states and local groups already have in place or are developing watershed plans and strategies at varying levels of scale, scope, and specificity that might contribute significantly to the process of developing and implementing watershed plans using the approach outlined in this handbook.

The existing plans and strategies should be adapted as appropriate or used as building blocks for developing and implementing watershed plans that contain the nine minimum elements that EPA recommends including in watershed plans that address impaired or threatened waterbodies. This can be accomplished by adapting existing plans to include the omitted components, incorporating by reference existing assessments or other information in a newly developed plan, or merging existing information into an updated plan that includes all the basic components.

Where existing plans and strategies have been developed at a basin-wide or other large geographic scale, they will usually need to be refined at the smaller watershed scale to provide the information needed to develop a watershed plan. The assessment, monitoring, and other data collection requirements for larger basin studies typically are not as detailed as those for watershed plans or assessments generated for site-level work plans.

1.2 What's Inside?

The handbook is divided into 13 chapters that move through the watershed planning and implementation process (table 1-1). Each chapter includes information that addresses the key issues for each step, along with highlights to illustrate how to apply these concepts to your own situation. In addition, the appendices provide more detailed information on additional resources and worksheets that can be used as part of your watershed planning efforts.

1.2.1 Chapter Summaries

Chapter 1: Introduction includes the purpose of the handbook, intended audiences, and guidelines on how to use the information provided.

Chapter 2: Overview of Watershed Planning Process provides an overview of the watershed planning process and highlights common features of typical watershed planning processes.

Table 1-1. Relationship of Chapters to the Watershed Planning Process

Chapter		Steps in Watershed Planning and Implementation Process
1	Introduction	
2	Overview of Watershed Planning Process	
3	Build Partnerships	Build Partnerships
4	Define Scope of Watershed Planning Effort	Characterize the Watershed
5	Gather Existing Data and Create an Inventory	
6	Identify Data Gaps and Collect Additional Data if Needed	
7	Analyze Data to Characterize the Watershed and Pollutant Sources	
8	Estimate Pollutant Loads	Set Goals and Identify Solutions
9	Set Goals and Identify Load Reductions	
10	Identify Possible Management Strategies	
11	Evaluate Options and Select Final Management Strategies	Design Implementation Program
12	Design Implementation Program and Assemble Watershed Plan	
13	Implement Watershed Plan and Measure Progress	Implement Watershed Plan
		Measure Progress and Make Adjustments

Chapter 3: Build Partnerships provides guidance on initial activities to organize and involve interested parties, such as identifying stakeholders, integrating other key programs, and conducting outreach.

Chapter 4: Define Scope of Watershed Planning Effort discusses the preliminary activities you undertake to start scoping out your planning effort. It includes information on defining issues of concern, developing preliminary goals, and identifying indicators to assess current conditions.

Chapter 5: Gather Existing Data and Create an Inventory discusses the first step in watershed characterization—gathering existing information and creating a data inventory. It includes the collection of information from existing reports and datasets.

Chapter 6: Identify Data Gaps and Collect Additional Data if Needed discusses how to identify data gaps and collect additional data if needed. This chapter includes a discussion on quality assurance/quality control procedures and the development of sampling plans.

Chapter 7: Analyze Data to Characterize the Watershed and Pollutant Sources discusses the primary data analyses needed to identify problems and support development of the plan. It includes information on the types of data analyses that can be conducted and the tools used. It also discusses how to link the impairments to the causes and sources of pollutant loads.

Chapter 8: Estimate Pollutant Loads provides guidance on using watershed models and other tools to estimate pollutant loads. It discusses computer models, identifies the types of models available, and tells how to select appropriate models for your watershed study.

Chapter 9: Set Goals and Identify Load Reductions discusses how to set management and water quality goals, develop management objectives, and determine the load reductions needed to meet the goals. It provides guidance for identifying critical areas to which management efforts can be targeted.

Chapter 10: Identify Possible Management Strategies gives an overview of various management measures that might be selected, discusses how to identify existing management efforts in the watershed, and provides considerations for selecting management options.

Chapter 11: Evaluate Options and Select Final Management Strategies discusses how to screen and research candidate management options, evaluate possible scenarios, and select the final management measures to be included in your watershed management plan.

Chapter 12: Design Implementation Program and Assemble Watershed Plan

provides guidance on establishing milestones and implementation schedules and identifying the technical and financial resources needed to implement the plan, including information/education (I/E) activities and monitoring and evaluation components. It discusses how to use various analyses and products to assemble and document the watershed plan.

Chapter 13: Implement Watershed Plan and Measure Progress provides guidance on using adaptive management techniques to make changes to your watershed plan and on analyzing the monitoring data to determine whether milestones are being met. It also provides guidance on using a watershed plan to develop annual work plans.

1.2.2 Appendices and Back Matter

Appendix A: Resources is an expanded list of resources provided to guide you to more detailed information on various aspects of the watershed planning process.

Appendix B: Worksheets provides a complete set of all the worksheets and checklists included in the handbook as full-size sheets that you can photocopy and use with your planning group.

A ***Glossary*** is provided after appendix B to define key terms used in the handbook.

A ***Bibliography*** that lists the sources used to prepare the handbook is included.

Look for this Handbook on the Web!

You can download a pdf version of this document at
• www.epa.gov/owow/nps/pubs.html.

1.3 How to Use this Handbook

Although there is no cookie-cutter approach to developing a watershed plan, plans that seek to identify and address threats or impairments to water quality have some common elements. This handbook provides various tools for you to consider when developing your watershed plan and includes many Web links for more in-depth information on particular topics. The document is structured so you can proceed step by step through the watershed planning process or can go directly to a section that highlights a specific technical tool for use in your watershed planning effort.


Some common themes are repeated throughout the handbook to reinforce the concepts presented, provide shortcuts, and help you to focus your efforts. These tips are identified by the following icons:



Nine Elements of Watershed Plans. One of the purposes of this handbook is to show how the nine elements presented in the Clean Water Act section 319 guidelines are used to develop effective watershed plans for threatened and impaired waters.

Many organizations already have plans that include some of these elements but might require additional information on other elements. Note that most of the nine elements are presented in chapters 10–13.

🎯 **Targeting Your Efforts.** Although the handbook includes various options to be considered in each step of the watershed planning process, planners must target their efforts to move the process forward to achieve measurable progress in reducing specific pollutant loads. You might already have a good idea of the problems in your watershed and want to identify targeted management measures to address them. Or perhaps your watershed has only one pollutant of concern. The 🎯 icon highlights places in the planning process where it makes sense to target your efforts so you can focus your resources to identify the most likely problems and solutions for your watershed.

 **Watershed planning is not an exact science.** Often we have to make decisions based on our best professional judgment to move the process forward. However, there are several places along the way where you should stop and assess what you know, what information you have, and what additional information you need. If you see the stop sign, take a minute to read the information to make sure you're going down the right path with the right information.

🔗 This icon indicates where the topic is discussed elsewhere in the document, or where more information is provided in the text, the Resources appendix (appendix A), other documents or the Internet.

📄 **Worksheets and Checklists.** Worksheets and checklists are provided throughout the handbook to help you work through the watershed planning process with the stakeholders. The worksheets are noted with a 📄. A complete set is provided in appendix B to facilitate photocopying.

